WHAT IS CLAIMED IS:

1. A system for performing a chemical mechanical polishing process, the system comprising:

a chemical mechanical polishing (CMP) apparatus;

a measuring apparatus operable to measure the thickness of a layer on a substrate and generate data indicative of the measured thickness, whereby pre-polishing and post-polishing thicknesses of the layer can be measured;

a database operatively connected to said measuring apparatus so as to store data of the pre-polishing and post-polishing thicknesses measured by said measuring apparatus;

an endpoint detection system operatively connected to said CMP apparatus so as to control said CMP apparatus to operate in an endpoint detection mode wherein a substrate is monitored to detect when a layer underlying an upper targeted polishing layer on the substrate is exposed;

a closed loop control manager operatively connected to said measuring apparatus so as to receive the thickness data from the measuring apparatus, said closed loop control manager having a processor that calculates a polishing time on the basis of the thickness data from the measuring apparatus, and said closed loop control manager operatively connected to said CMP apparatus so as to control said CMP apparatus to operate in a closed loop control mode wherein the polishing of a layer is carried out for said polishing time; and

an operator interface operatively connected to said CMP apparatus,

said interface directing the CMP apparatus to be selectively operated in said endpoint detection mode under the control of said endpoint detection system, and in said closed loop control mode under the control of said closed loop control manager.

2. The system as recited in claim 1, wherein said interface has an input section by which an operator can input to said CMP apparatus data of process recipes for chemical and mechanical polishing processes carried out when said CMP apparatus is operating in said endpoint detection and closed loop control modes, and a display by which the progression of the polishing process carried out by the CMP apparatus can be monitored.

3. The system as recited in claim 1, wherein the endpoint detection system comprises an optical endpoint detection system that includes a light source for illuminating the target layer, and a detector operable to convert light reflected from the target layer to a corresponding electric signal.

4. The system as recited in claim 1, wherein the endpoint detection system comprises a current motor control detection system.

5. The system as recited in claim 1, wherein said closed loop control manager is operatively connected to said operator interface such that the polishing time is transferred thereto automatically once the endpoint

detection system detects that the layer underlying the upper target layer is exposed.

6. A method of a chemically mechanically polishing a semiconductor wafer having different layers disposed thereon one above the other, the polishing method comprising:

(*a*) polishing an upper target layer on the wafer using a chemical mechanical polishing (CMP) apparatus;

(b) monitoring the semiconductor wafer to detect when the polishing of said upper layer exposes a lower target layer disposed beneath the upper layer;

(*c*) once the upper layer is completely polished, measuring the thickness of the lower layer;

(*d*) calculating a polishing time corresponding to the measured thickness of the lower layer; and

(*e*) polishing the lower layer for a time period based on said polishing time.

7. The method as recited in claim 6, wherein the monitoring of the semiconductor wafer comprises illuminating the wafer, and detecting beams of light that reflect from the wafer.

8. The method as recited in claim 6, wherein the monitoring of the semiconductor wafer comprises detecting the amount of current flowing

to a motor of the CMP apparatus.

9. The method as recited in claim 6, wherein the calculating of the polishing time is carried out using a totality of empirical data derived each time a lower target layer is polished by the CMP apparatus.

10. The method as recited in claim 9, wherein the calculating of the polishing time comprises assigning respective weights to the empirical data according to a sequence in which the empirical data is derived.